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E-mail:jfewr@yahoo.com

ISBN: 2141 – 1778

Nwoha and Agu, 2019

INCIDENCE OF SCHISTOSOMOSIS IN MONGREL IN COMMUNITIES IN IKWUANO LOCAL GOVERNMENT AREA, ABIA STATE, NIGERIA

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ABSTRACT

Zoonotic infectious agents are among the most prevalent on earth and are thought to be responsible for more than 60 per cent of all human infections and also 75 per cent of emerging human infectious diseases. This study investigated the existence of schistosomosis in dogs in Ikwuano communities as possible source of human infection. Samples were collected from dogs within 20 out of a total of 36 communities in Ikwuano Local Government Area of Abia state. Both faecal and anal swab samples were collected from dogs of various breeds, age bracket and sex. Samples were analyzed using direct microscopy of faecal and anal swab samples, sedimentation and feacal salt flotation techniques. Data obtained was analyzed using descriptive statistics. The incidence of the disease was determined and presented in percentage. Out of a total of 20 communities' sampled only 2 namely Amaoba ime and Afa communities were positive for schistosomosis. Out of 23 dogs sampled in Amaoba ime, 6 were exotic while 17 were Mongrels. All the exotic were negative while 3(13.0%) out of the 17 mongrels were positive. Out of these, 18 were females with 2(8.7%) positive cases and 16 (70.0) negative cases. Out of the 5 males sampled only 1(4.3%) was positive while 4 (17.4%) was negative. A total of 14 adults were sampled with 2(8.7%) positive cases and 14 (61.0%) negative cases. Out of the 9 puppies sampled only 1(4.3%) was positive while 8 (34.8%) were negative. In Afa community, only 2 (14.3%) negative exotic breeds were sampled out of 14 dogs. Out of the 12 mongrels sampled, 11(78.6%) were negative while 1(7.1%) was schistosoma positive. All the 6 females sampled were negative while 1(7.1%) out of the 8 males was positive. Out of a total of 14 adults, only 1(7.1%) was positive while 13(92.9%) were negative. No puppy was sampled within the area.

Keywords: Exotic, mongrel, schistosome, dogs, ikwuano, Abia, State

INTRODUCTION

The World Health Organization further estimated that Schistosome infection and geo-helminths account for over 40% of the world tropical disease burden apart from malaria (Ovelda *et al.*, 2000). In Nigeria, *Schistosoma* infection occurs in all human population with prevalence ranging from 9% to 70 % especially in high poverty stricken rural areas (Okoli and Odaibo 1999; Mafiana *et al.*, 2003; Salawu and Odaibo 2013; Salawu and Odaibo, 2014). Many of these areas had in one time or the other enjoyed mass drug administration either from the local or state government (Okoli and Odaibo 1999; Mafiana *et al.*, 2003; Salawu and Odaibo 2013). The success and widespread epidemiology of these infections can be attributed to a range of human factors including social and dietary changes as well as an increased mobility of the human population (McCarthy and Moore 2000; Vorou *et al.*, 2007). Although the major hosts for *Schistosoma mansoni* and *Schistosoma haematobium* are humans, a range of animals including sheep, cattle and horses act as natural definitive hosts for *Schistosoma japonicum*

(Gryseels *et al.,* 2006). Similarly, high prevalence of schistosomosis recorded in a study conducted in Ogun State was attributed to presence of snail intermediate host in the natural water bodies and lack of potable water supply (Salawu and Odaibo, 2012). With the increasing incidences of schistosomosis in human populations in different parts of the globe and animals serving as reservoir host, it has therefore become pertinent to ascertain the incidences of schistosomosis in dogs in various communities in Ikwuano, Abia State.

MATERIALS AND METHODS

Study Area

Ikwuano is one of the Local Government Area in Abia State, Nigeria with its headquarters located in Isiala Oboro. It has an area of 281 km² and a population of 137,993 at the 2006 census. It is positioned at latitude 5.4093^{oN} and longitude 7.5897^{oE}. It is made up of 52 villages and 36 communities and is bounded on the West by Ini LGA of Akwa Ibom State and Umuahia on the North, On the East by Umuahia south and Isiala Ngwa North LGA on the South. Ikwuano as the name implies is derived from the coming together of four (4) related brothers namely Oboro, Ibere Ariam-Usaka and Oloko. Ikwu which means "relations/relatives" and Ano which is "four" (4) meaning "four relations". Ikwuano Local Government Area was among the local government areas created on 27th of August 1991 by General Ibrahim Babangida's Administration. It was carved out of the old Ikwuano-Umuahia Local Government Area. It is one of the five Local Government Areas that make up Abia Central Senatorial District (NIPOST, 2009)

Experimental Design

Out of a total of 36 communities in Ikwuano Local Government Area, 20 were randomly selected and sampled for presence of Schistosomosis in dogs including those presented at the Veterinary Teaching Hospital, Michael Okpara University of Agriculture Umudike. Both faecal samples and anal swabs were collected from sampled dogs. Dogs of various breeds, age bracket and sex were sampled in the study.

Method of Sample Collection

The village chief, head or king of each community sampled were notified earlier before the day of sample collection. The town criers inform all dog owners to assembly their dogs at their village square for free deworming given as compensation for sample collection. Some refused while those sampled were dewormed immediately after sample collection.

From each sampled dog anal swab was collected and carefully placed into a container which had few drops of normal saline, to avoid drying. Also, faecal sample was collected directly from each dog (per rectum) with gloved finger and deposited into a faecal sample bottle. The samples were labeled for identification (by, date, numbers, breeds, sex, age, and locations) prior to transportation to the veterinary medicine labouratory for analysis (Urquhart *et al.*, 1996).

Faecal Floatation

Two grams of each of the faecal samples was deposited into a test tube. Saturated sodium chloride solution was added, mixed and then the tube was filled up with the solution. Then a cover slip was placed on the solution for about 30 minutes, before the slip was lifted carefully and placed on to a glass slide and viewed under the microscope at X10 and X40 magnification for *Schistosoma* eggs (Urquhart *et al.,* 1996).

Direct Microscopy of Anal Swab

A drop of normal saline was placed on a glass slide and swab from each dog was streaked onto it. The saline-swab extract mixture was then viewed under X10 and X40 magnification of the microscope (Pal and Sanyal, 2014).

Duration of Study

The study lasted for five months (between August and December 2017).

Data Analysis

The data collected was analyzed using descriptive statistics. The incidence of the disease was determined and presented in percentage using the formula described by Thrusfield and Christley (2018) where P = d/n, where P = percentage prevalence, d = number of positive sample, n = total number of samples collected. The incidence of schistomosis between breeds, sex, and age bracket were compared using independent sample T –test and presented as mean ± SE. The level of significance is accepted at $p<0.05$.

RESULT

From table 1 above, out of 23 dogs sampled in Amaoba ime in Abaa ukwu community, 3 (13.0%) out of the17 mongrels sampled were *schistosoma* positive, while 14 were negative. None of the 6 exotic breeds were *schistosoma* positive. Of the 23 dogs, 18 (78.3%) were females, and 16 (69.6%) were negative while 2 (8.7%) were positive. There were also 5 males sampled among the 23, out which 4 (17.4%) were negative and 1 (4.3%) was positive. In addition, there were 14 adults out of which 12 (52.2%) were negative with 2 (8.7%) positive cases. There were also 9 puppies out of which 8 were negative with 1 (4.3%) positive case.

In table 2 above, zero (0.0%) incidence of schistosomosis was recorded in all the four (4) communities sampled . In Ibere Nkalunta, only two (2) adult female mongrels were sampled and one (1) male mongrel in Umuemelike Community. Twelve (12) mongrels were sampled in Awom na ebo community. Out of which five (5) were females and 7 were males. Eleven (11) adults and one (1) puppy. In Umudike community, sixty (60) dogs were sampled out of which thiry (30) were exotic and thirty (30) mongrels. There were twenty nine (29) males and thirty one (31) females. Forty seven (47) were adults and thirteen (13) puppies.

Zero (0.0%) prevalence of Schistosomosis was recorded in all the four (4) communities represented on table 3 above. Out of five (5) dogs sampled in Usaka azunchai community, three (3) were exotic breeds and two (2) mongrels. There were two (2) adult and three (3) puppies.

Seventeen (17) dogs were sampled in Usaka obugwu out of which nine (9) were exotic breeds and eight (8) were mongrels. There were four (4) females and thirteen (13) males, thirteen (13) Adults and four (4) puppies A total of eighteen (18) dogs were sampled in Oruigwe nnono community, three (3) exotic breeds and fifteen (15) mongrels. There were seven (7) females and eleven (11) males, sixteen (16) adults and two (2) puppies. Of the three (3) dogs sampled in Ibere obohia community, all the three (3) were mongrels with no exotic breed. There were one (1) female and two (2) males, two (2) adults and one (1) puppy.

Table 1: Percentage (%) incidence of Schistosomosis in dogs of various breeds, age, and sex sampled in Amaoba ime in Abaa ukwu community in Ikwuano LGA in Abia State

Variables	Sample size	Positive samples	Negative samples	Total sample collected	Percentage incidence (%)
Type					
Exotic	6	0	6		0.0
Local	17	3	14	23	13.0
Sex					
Female	18	2	16		8.7
Male	5	1	4	23	4.3
Age					
Adult	14	2	12		8.7
Puppy	9	1	8	23	4.3

Table 2: Percentage (%) incidence of Schistosomosis in dogs of various breed, age, and sex sampled in Five (4) communities in Ikwuano LGA in Abia State

Ibere Nkalunta Community				
Variables	**Sample size**	**Positive samples**	**Total sample collected**	**Percentage incidence (%)**
Types				
Exotic	0	0		0.0
Local	2	0	2	0.0
Sex				
Female	2	0		0.0
Male	0	0	2	0.0
Age				
Adult	2	0		0.0
Puppy	0	0	2	0.0
IBERE UMUEMELIKECOMMUNITY				
Type				
Exotic	0	0		0.0
Local	1	0	1	0.0
Sex				
Female	0	0		0.0
Male	1	0	1	0.0
AGE				
Adult	0	0		0.0
Puppy	1	0	1	0.0
Awom Na Ebo Community				
TYPE Exotic	0	0		0.0
Local	12	0	12	0.0
SEX				
Female	5	0		0.0
Male	7	0	12	0.0
AGE				
Adult	11	0		0.0
Puppy	1	0	12	0.0
Umudike Community				
TYPE				
Exotic	30	0		0.0
Local	30	0	60	0.0
SEX				
Female	29	0		0.0
Male	31	0	60	0.0
AGE				
Adult	47	0		0.0
Puppy	13	0	60	0.0

Table 3: Percentage (%) incidence of Schistosomosis in dogs of various breed, age, and sex sampled in Four (4) communities in Ikwuano LGA in Abia State

Variables	Sample size	Positive samples	Total sample collected	Percentage incidence (%)
Ibere nkalunta community				
Types				
Exotic	3	0		0.0
Local	2	0	5	0.0
Sex				
Female	2	0		0.0
Male	3	0	5	0.0
Age				
Adult	2	0		0.0
Puppy	3	0	5	0.0
Usaka obugwu community				
Type				
Exotic	9	0		0.0
Local	8	0	17	0.0
Sex				
Female	4	0		0.0
Male	13	0	17	0.0
Age				
Adult	13	0		0.0
Puppy	4	0	17	0.0
Oruigwe nnono community				
Type				
Exotic	3	0		0.0
Local	15	0	18	0.0
Sex				
Female	7	0		0.0
Male	11	0	18	0.0
Age				
Adult	16	0		0.0
Puppy	2	0	18	0.0
Ibere obohia community				
Type				
Exotic	0	0		0.0
Local	3	0	3	0.0
Sex				
Female	1	0		0.0
Male	2	0	3	0.0
Age				
Adult	2	0		0.0
Puppy	1	0	3	0.0

Table 4: Percentage (%) incidence of Schistosomosis in dogs of various breed, age, and sex sampled in Four (4) communities in Ikwuano LGA in Abia State

Variables	Sample size	Positive samples	Total sample collected	Percentage incidence (%)
Amizi community				
Types				
Exotic	2	0		0.0
Local	4	0	6	0.0
Sex				
Female	3	0		0.0
Male	3	0	6	0.0
Age				
Adult	5	0		0.0
Puppy	1	0	6	0.0
Ala ala oboro community				
Type				
Exotic	9	0		0.0
Local	8	0	17	0.0
Sex				
Female	4	0		0.0
Male	13	0	17	0.0
Age				
Adult	13	0		0.0
Puppy	4	0	17	0.0
Oloko community				
Type				
Exotic	0	0		0.0
Local	8	0	8	0.0
Sex				
Female	3	0		0.0
Male	5	0	8	0.0
Age				
Adult	8	0		0.0
Puppy	0	0	8	0.0
Ibere isiala community				
Type				
Exotic	0	0		0.0
Local	12	0	12	0.0
Sex				
Female	7	0		0.0
Male	5	0	12	0.0
Age				
Adult	10	0		0.0
Puppy	2	0	12	0.0

Zero (0.0%) prevalence of schistosomosis was recorded in the four communities represented on table 4 above. Out of the six (6) dogs sampled in Amizi, two (2) were exotice breeds and four (4) mongrels. There were three (3) females and three (3) males, five (5) adults and one (1) puppy.
A total of twenty one (21) dogs were sampled in Ala ala oboro, Ten (10) of which were exotic breed and eleven (11) mongrels, eleven (11) females and ten (10) male, seventeen (17) adults and four (4) puppies. Eight 98) dogs were sampled in Oloko community. Out of these, three (3) were females and five (5) males, eight (8) adults and no puppy. Twelve (12) dogs were sampled in Ibere isiala community. All were mongrels with no exotic breed. There were seven (7) females and five (5) males, ten (10) adults and two (2) puppies.

Seventy one percent (7.1%) prevalence was established in all the four (4) communities represented on table 5 above. Out of the fourteen (14) dogs sampled in Afa community, only one (1) adult mongrel was positive for *schistosoma* eggs. Twelve (12) were mongrels and two (2) exotic breeds. There were six (6) females and eight (8) males, fourteen (14) adults and no puppy. Eight (8) dogs were sampled in Oloko community, Three (3) females and five (5) males, eight (8) adults and no puppy. A total of thirty (31) dogs were sampled in Oru community, out of which twenty nine (29) were mongrels and two (2) exotic breeds. Twenty two (22) were females and nine (9) males. Twenty were (26) adults and five (5) puppies. Three (3) dogs were sampled in Ariam ndiorie out of which two (2) were mongrels and one (1) exotic breed. There were one (1) female and two (2) males, three (3) adults and no puppy.

In table 6 above, zero (0.0%) prevalence was recorded in all the four communities sampled for *schistosoma* eggs. In Ariam Ekelu community, a total of four (4) exotic breeds of dog were sampled and zero mongrels. Out of this, one (1) was a female and the (3) males. There were three (3) adults and one (1) puppy.

In Isiama Ekebiri Community, a total of sixteen (16) dogs were sampled all mongrels with zero exotic. Of this six (6) were females and ten (10) males, sixteen (16) adults and one (1) puppy. In Isiama Okire Community, a total of eighteen (18) dogs were sampled with five (5) exotic breeds and thirteen (13) mongrels, seven (7) females and eleven (11) males, fifteen (15) adults and three (3) puppies.
In Amaoba ikputu in Abaa Ukwu Community, a total of forty one (41) dogs were sampled out of which fourteen (14) were exotic and thirty seven (37) were mongrels. Twenty two (22) were females and nineteen (19) males, twenty eight (28) were adults and thirteen (13) puppies.

Table 5: Percentage (%) incidence of Schistosomosis in dogs of various breed, age, and sex sampled in FOUR (4) communities in Ikwuano LGA in Abia State

Afa community				
Variables	**Sample size**	**Positive samples**	**Total sample collected**	**Percentage incidence (%)**
Types				
Exotic	2	0		0.0
Local	12	1	14	7.1
Sex				
Female	6	0		0.0
Male	8	1	14	7.1
Age				
Adult	14	1		7.1
Puppy	0	0	14	0.0
Oru community				
Type				
Exotic	2	0		0.0
Local	29	0	31	0.0
Sex				
Female	22	0		0.0
Male	9	0	31	0.0
Age				
Adult	26	0		0.0
Puppy	5	0	31	0.0
Oloko community				
Type				
Exotic	0	0		0.0
Local	8	0	8	0.0
Sex				
Female	3	0		0.0
Male	5	0	8	0.0
Age				
Adult	8	0		0.0
Puppy	0	0	8	0.0
Ariam ndiorie community				
Type				
Exotic	1	0		0.0
Local	2	0	3	0.0
Sex				
Female	1	0		0.0
Male	2	0	3	0.0
Age				
Adult	3	0		0.0
Puppy	0	0	3	0.0

Table 6: Percentage (%) incidence of Schistosomosis in dogs of various breed, age, and sex sampled in four (4) communities in Ikwuano LGA in Abia State

Variables	Sample size	Positive samples	Total sample collected	Percentage incidence (%)
Ariam Ekelu community				
Types				
Exotic	4	0		0.0
Local	0	0	4	0.0
Sex				
Female	1	0		0.0
Male	3	0	4	0.0
Age				
Adult	3	0		0.0
Puppy	1	0	4	0.0
Isiama Ekeberi community				
Type				
Exotic	0	0		0.0
Local	16	0	16	0.0
Sex				
Female	6	0		0.0
Male	10	0	16	0.0
Age				
Adult	16	0		0.0
Puppy	1	0	16	0.0
Isiama Okire community				
Type				
Exotic	5	0		0.0
Local	13	0	18	0.0
Sex				
Female	7	0		0.0
Male	11	0	18	0.0
Age				
Adult	15	0		0.0
Puppy	3	0	18	0.0
Amaoba Ikputu in Abaa Ukwu community				
Type				
Exotic	4	0		0.0
Local	37	0	41	0.0
Sex				
Female	22	0		0.0
Male	19	0	41	0.0
Age				
Adult	28	0		0.0
Puppy	13	0	41	0.0

DISCUSSION

The result of this study confirms the existence of canine schistosomosis in ikwuano local government area despite the near absence of data on the disease condition in dogs in Nigeria. However researchers in Asian countries have identified dogs as reservoir of infection in humans (Carabin *et al.,* 2015). The disease have also been identified in other animal species such as water buffalo, cattle, rodents with high prevalence occurring in goats indicating their importance in the transmission of schistosomosis in humans (Clarf, *et al.,* 2017). Despite involvement of other species of animals in schistosomosis, dogs have shown consistent association in transmission of the disease in humans (Carabin *et al.,* 2015).

Information on canine schistosomosis is of most importance due to the close association of man with dogs and its potential as zoonotic risk to man. Canine schistosomosis produces a debilitating and often a fatal disease in dogs and although the disease manifests as diarrhea it is mostly under diagnosed during disease investigation. *Schistosoma* species often are not detected during routine feacal floatation for nematodes. Such negative samples are positive with fecal saline sedimentation and fecal polymerase chain reaction giving the true incidence of the disease in a population (Harizlicek *et al.,* 2011). The investigation in the existence of schistosomosis in dogs within communities in Ikwuano was strategic towards fostering the collapsed 1988 Federal Ministry of Health and National Schistosomosis program vision on a 5 year for 50% reduction on the prevalence of schistosomosis in profound areas in Nigeria (Ekpo and Mafiana, 2004). It also serve as a form of investigation in the report of high prevalence of estimated number of 20 million people infected with schistosomosis in all the 36 states of Nigeria including Federal capital territory Abuja (Adie *et al*., 2013).

The two communities in (tables 1) Amaoba Ime in Abaa ukwu and Afa in (table 5) where schistosomosis were detected in dogs were known for hunting, a vocation which exposes dogs to dangers in the wild. Such hunting dogs have high risk of exposure to parasitic diseases acquired through contamination with faeces from infected humans (Eileen, 2010). This practice also exposes dogs to areas with schistosome contaminated stagnant or running waters. Dogs and wildlife often are exposed to schistosomosis while swimming or wadding in fresh water areas such as marshes, mudflats and canals (Lee, 1962). In most settings high level of human–dog cross-infection are generally observed which raises great concern (Rudge *et al.,* 2008). Infected humans may develop skin dermatitis known as swimmers itch.

Conclusion Schistosomosis is among the reportable diseases in the world and therefore, knowledge of the prevalence and intensity of schistosomosis in any community is crucial in planning of the disease intervention and control strategies towards prevention of out break to safe communities.

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